themselves engage in the provision of telecommunications services. *See* Table 5.[43] Five of these alternative fiber suppliers have formed an industry coalition – the Coalition of Competitive Fiber Providers – which states that its members' business plans involve the "provision of competitive fiber-based transport services and dark fiber to competitive local exchange carriers . . . collocated in ILEC central offices."[44] The Coalition claims that its "members together represent a total capital investment of approximately $1 billion."[45] According to analysts, metropolitan fiber suppliers have raised about $2 billion in capital since the third quarter of 2000, and are still "some of the few getting capital."[46] These companies have recently raised significant additional funding through debt and vendor financing.[47] According to consulting firms Cambridge Strategic Management Partners and McKinsey & Co., "[t]he market for reselling . . . dark fiber to ISPs and telecom carriers is projected to grow from about $2 billion today to about $10 billion by 2006."[48]

Just like CLECs, alternative wholesale suppliers of fiber connect end users to their fiber rings, which in turn connect to interexchange carrier POPs and ILEC central offices.[49] Because

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[43] *See, e.g.*, J. Grubman, Salomon Smith Barney, *Grubman's State of the Union* at 15 (Mar. 21, 2001) ("there is an avalanche of metro capacity being deployed."); *Robertson Stephens Provides Outlook on Telecom Services*, PR Newswire (Sept. 7, 2000) ("We believe that we have reached the beginning of the end of the metropolitan bandwidth bottleneck . . . We are seeing a new generation of metropolitan bandwidth operators that will provide 100 Mbps plus connectivity at low cost to end users.").

[44] Coalition of Competitive Fiber Providers, Petition for Declaratory Ruling at 2, *Application of Sections 251(b)(4) and 224(f)(1) of the Communications Act of 1934, as amended, to Central Office Facilities of Incumbent Local Exchange Carriers*, CC Docket No. 01-77 (FCC filed Mar. 15, 2001) ("*Coalition of Competitive Fiber Providers Petition*"). The five coalition members are American Fiber Systems, Fiber Technologies, Global Metro Networks, Telergy, and Telseon.

[45] *Coalition of Competitive Fiber Providers Petition* at 2.

[46] P. Brown, *Despite Tighter Purse Strings, Cash Is Still Streaming to Metro Providers*, Tele.com (Aug. 13, 2001) (citing the Yankee Group and quoting Lehman Brothers Equity Research telecom analyst Blake Bath).

[47] *See, e.g.*, Looking Glass Networks Press Release, *Looking Glass Networks Nets Huge Debt Financing Round* (Mar. 2, 2001) (Looking Glass raised $275 million in debt in February of 2001); Metromedia Fiber Network Press Release, *Metromedia Fiber Network Successfully Completes $611 Million Financing Package* (Oct. 2, 2001) (Metromedia raised a total of $611 million in September of 2001); Yipes Press Release, *Yipes Closes $200 Million "C" Round of Funding* (Feb. 5, 2001) (Yipes secured $200 million in equity financing); Telseon Press Release, *Telseon Receive $175 Million in Financing* (Feb. 6, 2001) (Telseon secured $100 million in equity financing and $75 million in capital lease financing.).

[48] N. Orman, *Networking Startups Battle for Cities*, Silicon Valley/San Jose Bus. J. (Oct. 26, 2001).

[49] *See, e.g.*, *Coalition of Competitive Fiber Providers Petition* at 1 (emphasis added) (Our members "provide, or will provide, advanced fiber-based transport services, *including interoffice transport*, and/or dark fiber to end users and other telecommunications carriers. Coalition members together offer these services and products in virtually every region of the 'lower 48' states and the District of Columbia."); Looking Glass Networks, *FAQ*, http://www.lglass.net/aboutus/faq.jsp (Looking Glass's target customers include "Long Haul Carriers (IXCs), Incumbent Local Exchange Carriers (ILECs), Competitive Local Exchange Carriers (CLECs), Internet Service Providers (ISPs), data centers, bandwidth trading organizations, storage facility providers, wireless data providers and large enterprise customers."); *Wall Street Transcript Corp. Interview, John Peters – Sigma Networks* (John Peters, CEO, Sigma Networks: We're a Carrier's carrier. Our customers tend to be the backbone carriers that are looking to extend their reach within the metro, the service providers that host applications within the various data centers that need to get traffic to and from the various backbone networks, and then third would be broadband access networks, cable, DSL, and fixed wireless suppliers that need to interconnect their access networks into the metro to get to the data centers and the backbones.").

these alternative suppliers are "carrier agnostic," they can use their networks to serve multiple carriers at once, significantly improving the economics of deploying fiber.[50] For a growing number of CLECs, the fiber provided by these wholesale suppliers satisfies a large part of their demand for last-mile local connectivity and interoffice transport.[51] In fact, these alternative suppliers' networks are so expansive that even ILECs have begun purchasing fiber from them.[52]

In addition to this new breed of wholesale fiber suppliers, many of the nation's utility companies are now supplying local fiber to CLECs. *See* Table 6. Utility companies control a significant portion of the nation's fiber infrastructure – as much as 35 percent according to one source.[53] These companies have the advantage of being able to deploy fiber using their existing infrastructure. As one analyst notes, "If a company already has wires or pipes in the ground, the cost of entry is comparatively low."[54] Another analyst notes that "roughly half of the new metro networks being built in the United States are being constructed by utilities."[55]

Finally, several of nation's largest operators of long-haul fiber networks have recently constructed metropolitan fiber networks. *See* Table 7. These carriers have sold dark fiber on their long-haul networks to CLECs for many years, and have now begun leasing dark fiber on

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[50] *See, e.g., Wall Street Transcript Corp. Interview, John Peters – Sigma Networks* (John Peters, CEO, Sigma Networks: "[E]ach of these metro networks requires a very large amount of traffic to drive the unit cost down to a reasonable level. So by having us deploy a common network infrastructure that can be used by many carriers, we can get the traffic volumes aggregated on our network much more easily than any individual carrier can do on their own and therefore we can drive unit cost down faster."); *id.* (John Peters, CEO, Sigma Networks: "We take a position of neutrality with regard to our customers. . . . We're a neutral provider of broadband interconnections."); Looking Glass Networks, *Collocation*, http://www.lglass.net/products/collocation.jsp (Looking Glass Networks provides "carrier-neutral facilities"); F.J. Governali, *et al.*, Credit Suisse First Boston Corp., Investext Rpt. No. 2699472, Northeast Optic Network – Company Report at *3 (Sept. 10, 1998) (NEON's business plan "is lower risk than most of the emerging nationwide network builders" because it "plans to only operate as a carrier's carrier, which takes away the risk of competing with other carriers for end-user services and significantly decreases operating expenses.").

[51] *See, e.g.*, Allegiance Telecom Inc., Form 10-K405 (SEC filed Mar. 30, 2001) (Allegiance has leased fiber from suppliers in 25 markets, and claims that "[t]hese fiber rings are expected to provide [Allegiance] with a reliable, diverse and robust connection to most of [its] central office locations throughout a market."); *CTC Communications Announces Fully Funded Local Fiber Build-Out Plan; High Bandwidth Core Fiber Network to Be Extended to Verizon Local Switching Offices*, Bus. Wire (Dec. 19, 2000) (CTC purchased from a "number of dark fiber suppliers" "local fiber in selected geographical areas of eastern Massachusetts, southern New Hampshire, southern Maine and Rhode Island," which it claims will "extend CTC's existing high bandwidth fiber network backbone to Verizon local switching offices," and enable it to "eliminate the need for leased inter-office Verizon facilities."); Sprint Press Release, *Sprint Signs Multiyear Contract with Metromedia Fiber Network for Enhanced Access to Major U.S. Markets* (Dec. 4, 2001) (Sprint expects to begin using MFN networks in initial markets in the second quarter of 2002 and in all 10 cities by the end of 2002).

[52] *See, e.g.*, B. Wallace, *Bell Atlantic Eyes Further Expansion,* TechWeb (Oct. 18, 1999), http://www.informationweek.com/757/atlantic.htm (Bell Atlantic invested $550 million to gain access to MFN's local fiber networks in 50 cities); D. Rohde, *Looking for SBC Over the Horizon*, Network World Fusion (Aug. 21, 2000), http://www.nwfusion.com/columnists/2000/0821rohde.html?nf (SBC will buy local dark fiber nationwide from MFN).

[53] *See* J. Krause, *They've Got the Power*, The Standard (Dec. 27, 1999).

[54] I. McDonald, *Butterfly Companies: The Web Has Transformed These Utilities Firms*, The Street.com (Nov. 3, 2000), http://www.thestreet.com/funds/fundjunkie/1155477.html.

[55] K. Maddox, *New Era, New Partner – Old-Line Manufacturer Chooses Cinergy for Network Build*, tele.com (Mar. 5, 2001) (citing Forrester analyst Maribel Dolinov).

their metropolitan fiber networks as well. These carriers also have begun providing competitive local services to customers directly. To cite just one example, in January of this year, the District of Columbia City government agreed to lease dark fiber from Level 3 to create a high-speed data network linking government buildings at various locations across the city.[56]

[56] *Level 3 Selling Dark Fiber to District of Columbia City Government*, CLEC.com (Jan. 31, 2002), http://www.clec.com/newsprint.asp?ContentID=2147455397.

Table 5. Wholesale Local Fiber Suppliers		
	Cities with Operational and Planned(*) Networks	**Network Details**
Metromedia Fiber Networks	Seattle, Portland, San Francisco/Bay Area, Los Angeles, Phoenix, Denver, Dallas, Houston, Kansas City, Chicago, Miami, Boston, New York, Washington D.C., Atlanta	"Our existing intra-city networks consist of approximately 1,579,000 fiber miles covering in excess of 3,987 route miles in the United States."
Fiberworks	Atlanta, Charlotte, Birmingham*, Orlando*, Miami/Ft. Lauderdale*, Jacksonville*, Tampa/St. Petersburg*, New Orleans*, Raleigh/Durham*, Greenville/Spartanburg*, Nashville*, Dallas/Ft. Worth*, Austin*, San Antonio*, Houston*	"Fiberworks has installed over 3,000 fiber route miles."
American Fiber Systems	Salt Lake City, Kansas City, Nashville, Minneapolis, Cleveland AFS is developing dark fiber optic rings in 126 other cities across the country.	AFS plans to "help alleviate the band-width capacity shortage by installing more than 1.4 million miles of fiber-optic strands in second and third-tier U.S. cities over the next seven years."
Fibertech Networks	Albany, Buffalo, Rochester, Syracuse. Pending Completion: Hartford, Indianapolis, New Haven, Springfield, MA, Worcester, Columbus, Pittsburgh, Providence. Planned: 48 additional markets	Fiber Technologies "planned network infrastructure and diverse ring topology will encompass more than 40 cities, 6,400 route miles and in excess of 306,000 fiber miles."
Yipes	Santa Clara, Atlanta, Boston, Chicago, Dallas, Denver, Ft. Collins, Ft. Lauderdale, Houston, Longmont, Miami, New York, Palo Alto, Philadelphia, Pittsburgh, Riverside, San Diego, San Francisco, Seattle, Washington, D.C., Worcester	"Yipes has now over 3,600 route miles of fiber in our twenty-one markets, which is twice the route miles we had in December. With multiple fibers in each of its markets, Yipes has now lit 32,000 miles of fiber encompassing 128 metropolitan rings."
Telseon	Atlanta, Chicago, Cincinnati, Dallas, Denver, Detroit, Houston, Los Angeles, Miami, New York, Northern Virginia, Orlando, Philadelphia, Phoenix, San Diego, San Francisco Bay Area, Seattle, Silicon Valley, St. Louis, Tampa	"In 2001, Telseon increased its network points of presence from 120 to 160 locations . . . In 2002, Telseon will continue to expand its network to include multiple tenant buildings and large enterprises."
Looking Glass	Seattle, San Francisco, Los Angeles, Dallas, Houston, Atlanta, Chicago, Washington D.C., New York, Boston	With "over $15 million in signed customer contracts," Looking Glass "offers the full range of carrier class SONET, Ethernet and Wavelength lit services from 10 Mbps to 10 Gbps, along with dark fiber and carrier neutral collocation."
Northeast Optic Network (NEON)	Baltimore*, Boston, Bridgeport, Hartford, Keene, Manchester, Nashua, New Haven, New York, Newark*, Philadelphia*, Portland, Portsmouth, Providence*, Springfield, Stamford, Washington, D.C.,* White Plains, Worcester	NEON's "interstate, intercity, and local loop facilities comprise a network of approximately 1,900 route miles and more than 81,000 fiber miles."
Progress Telecom	Atlanta, Miami, New York, Raleigh, Saint Petersburg, South Florida, Tampa, Washington D.C.	"Progress Telecom incorporates approximately 130,000 fiber miles and 7,200 route miles in its network including over 150 Points-of-Presence (POPs)."
EPIK Communications	The lit network reaches 12 key cities, including the cities of Atlanta, Jacksonville, Orlando, Tampa, and Miami; EPIK is also developing fiber "metro rings" in these five cities totaling approximately 400 route miles.	EPIK has lit a 1,850 mile regional fiber in network in the Southeastern United States. EPIK is also developing fiber metro rings in Atlanta, Jacksonville, Orlando, Tampa, and Miami totaling 400 route miles.
NEESCom	Providence, Worcester, Metro West (MA region east of Worcester)	NEESCom has deployed "more than 700 route miles of dark fiber."
Sources: See Appendix M.		

Table 6. Utilities Providing Local Fiber	
Alameda Power & Telecom	"finalized a $16 million contract with Evansville, Ind.-based Vectren Communications Services for construction of a hybrid fiber optic/coaxial telecommunications network.," which "will allow the municipal utility to offer telecommunication services to its customers."
Bristol Virginia Utilities Board	"Six businesses now have high-speed Internet connections through the city's fiber-optic network, and two dozen others have requested the service. . . . Several telecommunications companies are interested in leasing the capacity to provide . . . telephone service."
Cinergy Communications	Cinergy Communications (a telecom subsidiary of Cincinnati's gas and electric provider, Cinergy Corp.) has begun leasing its fiber network that circles Cincinnati.
ConEdison Communications of New York	"ConEdison has embarked on a push to become a fiber-based carrier's carrier in the New York metro area, and is deploying all new fiber in ConEd's conduits. . . . 'If you're a retail provider and you touch our network at any POP, you could buy whatever unit of bandwidth you want into any building we have on the network,' [Peter Rust, president and CEO of ConEdison Communications] explained. 'You could go after that building, sell one or two customers, buy just what you need to cover those two customers and grow the bandwidth as you need it.'"
Edison Carrier Solutions	"San Diego's Edison Carrier Solutions has built a Southern Cal. network 2nd only to the incumbent phone provider and concentrates on SONET transport, also offering managed wavelength service and dark fiber leasing."
Electric Power Board of Chattanooga	"EPB, the [Chattanooga] city-owned electric utility, expanded two years ago into telecommunications to capitalize on the utility's fiber-optic lines originally installed to help with communications for its electricity service."
El Paso Global Networks	El Paso Global Networks (a subsidiary of natural gas and energy company El Paso Corp.) plans to spend $2 billion over the next four years on a nationwide fiberoptic network and "plans to overbuild its metropolitan areas to provide better connectivity."
FPL FiberNet	FPL FiberNet (a subsidiary of the utility holding group that includes Florida Power & Light) has a 2000 mile fiber network in Florida. It provides connectivity to major telecom centers in Florida, "including leading carrier hotels, NAP initiatives, international cable-heads and large central offices."
Grant County Public Utility District	"GCPUD will provide video services over its existing fiber-optic infrastructure, known as Zipp. When completed in 2005, the Zipp network will contain some 50,000 mi of fiber in its effort to reach 40,000 homes, businesses, and farms throughout Grant County. To date, the network passes about 7,000 homes with approximately 2,000 customers 'lit' and receiving services."
Lafayette Utilities System	"The Lafayette Utilities System has completed a 65-mile, 96-strand fiber-optic loop that offers broadband throughout the city. The loop passes within 1 mile of nearly every home in the city limits."
PPL Telecom	PPL Telecom will market its services in five metropolitan areas that company officials believe are underserved – the Lehigh Valley, Lancaster, Harrisburg, Scranton/Wilkes-Barre and Williamsport. "Our fiber, as it exists today, is within half a mile of 20,000 office buildings."
Progress Telecom	Progress Telecom is "building local metropolitan fiber networks to try to get the capacity out close to the buildings and the consumers where they need it."
Reliant Energy	Operates a 67-route mile fiber backbone in Houston.
Sempra Communications of Los Angeles	"L.A. utility firm Sempra Communications found a technique for running fiber conduit through pipelines without interrupting gas transmission and is attacking the last mile as 'the gold mine of the [telecom] industry.'
Telergy MidAtlantic	"Business customers in Northern New Jersey and Pennsylvania now have access to a powerful new source for telecommunications services. TMA combines the resources of Telergy's established telecom network with GPU's extensive last mile reach and communications construction experience."
Touch America (formerly Montana Power)	Owns and operates a 23,000-route-mile, state-of-the-art, high-speed fiber-optic network that will span 26,000-route miles, cross 40 states, and reach more than 140 major cities in 2002. Its network is used for long-haul services and "for Touch America's own direct connections to individuals and businesses through its wireless services, metropolitan fiber offerings, and private line, long-distance and Internet applications."

Table 7. Local Fiber Networks of IXCs That Supply Dark Fiber	
Company	**Cities with Operational and Planned(*) Networks**
Williams	Anaheim, Atlanta, Baltimore, Boston, Chicago, Dallas, Houston, Los Angeles, Miami, Minneapolis, New York, Newark, Philadelphia, Phoenix, San Francisco, San Jose, Santa Clara, Seattle, St. Louis, Washington, D.C. (*construction is planned in 40 more cities by the end of 2001)
Level 3	Atlanta, Baltimore, Boston, Chicago, Cincinnati, Dallas, Denver, Detroit, Jersey City, Houston, Long Island, Los Angeles, Miami, New York, Newark, Orlando, Philadelphia, Phoenix, San Diego, San Francisco, San Jose, Seattle, St. Louis, Stamford, Tampa, Washington, D.C.
Global Crossing	New York, Philadelphia, Washington, D.C., Atlanta, Miami, Dallas, Chicago, San Francisco, San Jose, Los Angeles
Qwest	Baltimore, Chicago, Dallas/Ft. Worth, Houston, Kansas City, Los Angeles, New York, Sacramento, San Francisco, San Jose, St. Louis, Washington, D.C.
Sources: See Appendix M.	

IV. LOCAL LOOPS

As the Commission has recognized, loops come in a wide range of capacities. The availability of competitive substitutes varies accordingly. In addition, the availability of substitutes varies significantly among geographic markets.

A. High-Capacity Loops.

The FCC defines a "high-capacity loop" as a loop from a customer to an ILEC central office that is capable of supporting a service at DS-1 speeds (*i.e.*, 1.544 Mbps) or higher.[1] A DS-1 facility consists of 24 individual 64 kbps DS-0 circuits, the bandwidth normally used for a single voice channel.[2] The individual circuits on DS-1 loops and higher can, however, be configured to provide any mix of voice and data services.[3] High-capacity loops are almost always provided to medium or large business customers.

As described in Section III, competitive access providers began deploying fiber networks immediately after the Bell break up, to provide interoffice transport between the ILECs' Class 5 switches and the Interexchange Carriers' Class 4 counterparts. CLECs then began extending their fiber between ILEC central offices. They then moved beyond carrier-to-carrier services, extending their fiber to provide a full range of high-capacity local services to large private customers.

The economics of supplying high-capacity loops are exactly the same in the service of large customers as they are in the service of carriers. Either way, high traffic volumes between specific pairs of points justify the deployment of new fiber. And the further the competitive fiber network runs, the more economical it becomes to add customers along the existing route, and to extend the fiber further still.

1. CLEC Fiber as a Substitute for High-Capacity ILEC Loops.

Collectively, CLECs use their own last-mile facilities to serve the vast majority of their large business customers. CLECs serve no fewer than 13 million business lines and likely closer to 20 million business lines using their own switches, yet they have obtained only about 1.5 million stand-alone unbundled loops to serve business customers. *See* Table 1.[4]

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[1] 47 C.F.R. § 51.319(a)(1) ("The local loop network element is defined as a transmission facility between a distribution frame (or its equivalent) in an incumbent LEC central office and the loop demarcation point at an end-user customer premises. . . . The local loop includes, but is not limited to, DS1, DS3, fiber, and other high capacity loops.").

[2] *See* Whatis.com, *Digital Signal X*, http://whatis.techtarget.com/definition/0,,sid9_gci212004,00.html (DS0 has "a transmission rate of 64 kbps, the bandwidth normally used for one telephone voice channel." DS1 "is 24 DS0 (64 kbps) signals.").

[3] *See* Qwest, *Data, DS1*, http://www.qwest.com/pcat/small_business/product/1,1354,140_3_2,00.html ("Each DS-1 Service comprises 24 channels that may be assigned in a wide variety of ways to support switched access, local exchange service, low-speed data, voice grade communications, audio services and digital data services.").

[4] This calculation is a conservative estimate of the number of larger business customers that CLECs serve over their own loop facilities because many of the stand-alone unbundled loops that CLECs have obtained are likely used for smaller business customers.

Table 1. CLEC Business Lines Provided Over CLEC-Owned Last-Mile Facilities			
	Total Facilities-Based CLEC Business Lines	**Unbundled Business Loops***	**Business Lines Provided Over CLECs' Own Loops**
Verizon**	3.7 – 6.8 million	467,000	3.3 – 6.3 million
SBC***	4.5 – 7.4 million	765,000	3.7 – 6.7 million
BellSouth	1.8 – 3.2 million	229,000	1.6 – 3.0 million
Qwest	2.9 million	63,000	2.8 million
Total	**13 – 20 million**	**1.5 million**	**11 – 19 million**

*ILECs do not maintain data on whether an unbundled loop is used to serve a business or residential customer. We have developed the estimate of unbundled loops used to serve business customers as follows: CLECs provide at least 3 million residential lines over facilities they have deployed themselves, and approximately 1.5 million of these lines are provided over cable telephony networks. We assume the remaining 1.5 million residential lines are provided using unbundled loops, and that all other stand-alone unbundled loops provided by ILECs to CLECs are used to serve business customers.

**Total for Verizon does not include the former GTE service area. ***Total for SBC does not include Connecticut.

Any count of "lines," however, severely underestimates the CLECs' actual share of the business market. A high-capacity line represents more market share than a low-capacity line, and CLECs tilt their businesses strongly toward the former. While CLECs as a whole supply a total of between 13 and 20 million business lines using their own switches, 12 of the CLECs included in that total supply over 156 million voice-grade-equivalent *circuits*.[5] AT&T's Business division reports serving 2.7 million "local voice lines" but "over 30M DS0 equivalents."[6]

Based on the highly conservative count of *lines* that CLECs provide over their own facilities, the CLECs now supply at least 20 percent and likely closer to 28 percent of all business lines nationwide. *See* Figure 1. That percentage is undoubtedly much higher in major metropolitan areas where the largest business customers are concentrated.[7] The FCC's own data confirm that the CLECs' share of large business customers is considerably higher than their share of the overall business market.[8]

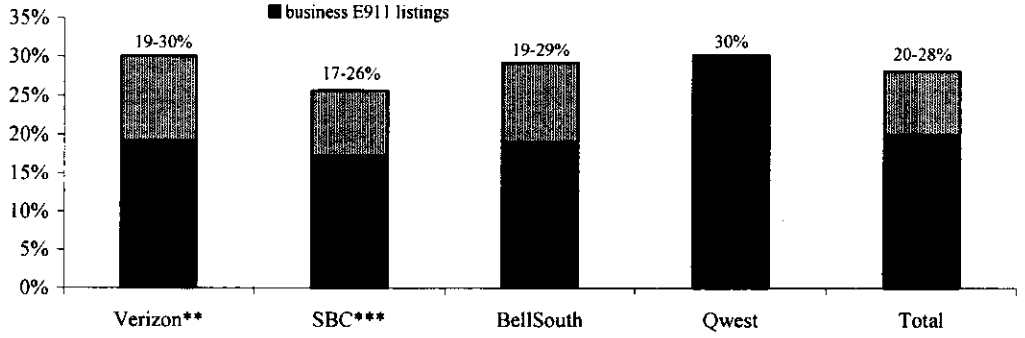
[5] *See* Section I.B & Table 4, Appendix A.

[6] D. Dorman, President, AT&T, *Presentation Before the Lehman Brothers T3 Telecom, Trends & Technology Conference* (Dec. 6, 2001).

[7] *See, e.g., UNE Remand Order* ¶ 291, n.573 ("The local competition that has developed has focused on larger business customers in large cities, not on residential or small business customers."); FCC, *Biennial Regulatory Review 2000 – Staff Report*, App. IV, Pt. 54, 15 FCC Rcd 21089, 21266 (2000) ("Competition for business customers in metropolitan areas has, in general, developed more rapidly than competition for residential customers or customers in rural areas."); *FCC Local Competition Report, Dec. 1998 ed.* at 2 ("Facilities-based CLECs appear to have concentrated in more urbanized areas.").

[8] According to FCC's most recent *Local Competition Report*, CLECs' share of the "Medium to Large Business Market" was nearly four times their share of the "residential and small business market." *FCC Local Competition Report, Feb. 2002 ed.* at Table 2.

Figure 1. Percentage of Total Business Lines in BOC Regions Served Over CLEC Switches



*The totals for facilities-based business lines based on interconnection trunks represent the additional lines produced by this methodology over the number of E911 listings that CLECs have obtained. The high-end of the range given on each bar threrfore represents the percentage of lines served using the interconnection trunk method, whereas the low-end of the range represents the percentage using E911 listings.
**Verizon data do not include CLEC or ILEC lines in the former GTE territory.
***SBC data do not include CLEC or ILEC lines in Connecticut and Nevada.

These totals also are consistent with the significant inroads that CLECs have made into the special access market. The provision of special access service typically involves both a high-capacity loop and, as discussed in Section III, interoffice transport. Because special access revenues are highly concentrated among a relatively small number of wire centers, CLECs have been able precisely to target their facilities to serve this lucrative market. Today, CLECs account for between 28 and 39 percent of all special access revenue.[9]

It does not take a very far-flung network to reach a very significant number of high-volume customers. It has been estimated that, in a typical Tier-One MSA, just 200 to 300 multi-tenant units – out of an average of 15,000 or more multi-tenant units in such MSAs – generate an estimated *80 percent* of the data revenues generated in those MSAs.[10] And the top 15 MSAs generate almost 80 percent of the nation's data traffic.[11] Just four MSAs – New York, San Francisco, Washington, D.C., and Los Angeles – generate some 40 percent.[12]

Most CLECs do not report how many buildings their fiber networks serve.[13] Public data are available for only about 20 CLECs;[14] as of year-end 2001 this small subset of CLECs

[9] *See* Appendix L.

[10] *See Lehman/McKinsey MAN Report* at 8 (emphasis added) ("enterprise traffic is currently very concentrated, as in a typical Tier One MSA, 200 to 300 MTUs (of more than 15,000) constitute 80% of data revenues.").

[11] *See id.* at Figure 3.

[12] *See id.* at 6-7.

[13] *See, e.g., CSFB 3Q01 CLEC Vital Signs Review* at Exh. 16 (total buildings data for 8 of the 14 profiled CLECs were not available); J. Atkin & D. Coleman, Dain Rauscher Wessels, *City Light: An Investor's Guide to Metropolitan Optical Services* at 11 (Mar. 22, 2001) ("Few carriers release detailed data on their fiber networks.").

[14] By comparison, there are at least 110 CLECs as well as numerous wholesale fiber suppliers that currently operate metropolitan networks. *See NPRG CLEC Report 2002, 15th ed.*, Ch. 6; Section III.C.

operated networks that served approximately 330,000 buildings.[15] This figure, however, includes "off-net" buildings – buildings served in part using facilities leased or resold from another competing carrier or an ILEC. CLECs have estimated that the number of unique office buildings served entirely by their fiber networks is roughly 30,000 nationwide.[16]

Given that CLECs route them to large commercial office buildings and other points of high traffic concentration, CLEC networks are clearly capable of serving far more high-capacity business lines than they currently do. Once they extend their network to serve one customer in a building, CLECs can vie for the business of all the other tenants, too. And CLEC fiber networks are now so extensive that they readily can be – and routinely are – extended as needed to pick up additional traffic from new customers in adjacent buildings, or down the block, and on outward, incrementally, from there. Once an initial fiber ring is deployed in a metropolitan area, extending that fiber incrementally to new customers is comparatively cheap.[17] When they deploy fiber, carriers invariably deploy far more capacity than they can use immediately, to facilitate precisely this process of incremental future development.[18] And the bigger the network grows, the more economical it becomes to extend it to reach additional, lower-traffic, lower-revenue customers.

Rapidly rising traffic volumes make the economics of deploying competitive fiber increasingly attractive. Traffic volumes from "large enterprises" – which generate half of the traffic in metropolitan markets[19] – are growing at an estimated 40 percent a year.[20] Data traffic for small and mid-size enterprises is growing at an estimated 60 to 70 percent a year.[21] As traffic volumes rise, competitive fiber networks quickly move from merely "competitive" to markedly

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[15] *NPRG CLEC Report 2002, 15th ed.*, Ch. 4 at Table 19. This is a highly conservative estimate. It excludes not only the buildings served by literally dozens of CLECs, but also does not include the 27,000 additional buildings NPRG reports for competitive Independent Operating Companies, utility CLECs, data providers, Gig-E providers, fiber layers, and other providers. *See id.* Moreover, the total buildings have been adjusted downward to address the concerns that CLECs raised in the Special Access proceeding in April of 2001 (CC Docket No. 96-98).

[16] *See* Joint Comments of Allegiance Telecom, Inc. and Focal Communications Corporation at 25, *Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, CC Docket No. 96-98 (FCC filed June 11, 2001); Comments of WorldCom, Inc. at 7, *Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, CC Docket No. 96-98 (FCC filed June 11, 2001).

[17] As the FCC has noted, "[t]he technological advances in fiber and electronics have made expansion of transport capacity relatively inexpensive. Once a competitor has infrastructure in place, the marginal cost of adding customers is not significant, and competitors are not likely to lack sufficient capacity for an extended period." Brief of FCC, Respondent, at 36, *MCI WorldCom v. FCC*, No. 99-1395 *et al.* (D.C. Cir. filed Nov. 30, 2000).

[18] *See* B. Gain & D. Dunn, *Is the Fiber Glut for Real?*, EBN (Dec. 10, 2001), http://www.ebnonline.com/story/OEG20011210S0066 ("Because excavation costs are high, many telcos overbuilt intentionally to avoid having to tear up lines to meet future demand."); O. Kharif, *The Fiber-Optic "Glut" – In a New Light*, Bus. Week Online (Aug. 31, 2001), http://www.businessweek.com/bwdaily/dnflash/aug2001/nf20010831_396.htm ("Since the total cost of laying cable can reach $1 million per mile – including everything from digging trenches to obtaining permits – telecoms often drop as much fiber into a ditch as they can. That's far cheaper than installing capacity as demand dictates."); *Federal-State Joint Board on Universal Service*, Tenth Report and Order, 14 FCC Rcd 20156, ¶ 199 (1999) ("industry practice [is to build] distribution plant to meet ultimate demand.").

[19] *See Lehman/McKinsey MAN Report* at 8.

[20] *See id.*

[21] *See id.*

superior. Next-generation technologies (SONET-lite, Metro DWDM and Gigabit Ethernet) are estimated to be 30 to 70 percent more cost-efficient than legacy networks.[22] Network capacities are rarely if ever an issue; year by year it gets easier and cheaper to boost the capacity of existing fiber by upgrading the electronics that "light" it. Data-carrying capacities are indeed doubling about every 9-10 months.[23]

In these circumstances, it is not surprising to find that CLECs and wholesale fiber suppliers widely tout their willingness to extend their networks to pick up new customers and traffic.[24] One declares that its network is "available" to all businesses that "pass within 6000 feet"[25] and will "provide[] the fiber-optic link from its access network directly into the building."[26] Another emphasizes its willingness to "work together with a customer to construct a spur to that customer from an existing fiber ring."[27] Another will "bring our fiber right up to our customers' floors in their buildings and provide them with wall-to-wall seamless connectivity."[28] Another will "provide its customers with fiber optic connectivity to virtually any location in its service territory" using a process that is "quick and efficient."[29] Another will connect to "the main Class-A buildings in a downtown business district."[30] CLECs also may extend their fiber networks through fixed wireless connections,[31] which can be deployed much more quickly and

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[22] *See id.* at 1.

[23] *See, e.g., Industry Buzz*, Forbes (Jan. 8, 2001), http://www.forbes.com/forbes/2001/0108/154s01.html (Lucent states that "fiber-optic cable capacity will double in the first nine months of [2001]"); L. Walker, *Fiber Optimist Revolution,* Amarillo Globe-News (Oct. 15, 2000), http://www.amarillonet.com/stories/101500/ bus_fiberopt.shtml (quoting Dan Schaeffer, Cogent Communications: "Fiber is doubling its capacity to carry data every 10 months.").

[24] Time Warner Telecom's CEO, Larissa Herda, recently noted that her company was recently able to win a large-customer contract because of their "ability to construct our own fiber facilities into their seven locations in four cities within 30 days." *See Time Warner Telecom Announces Fourth Quarter Results, Conference Call* (Feb. 5, 2002).

[25] *Fiberworks to Light Up Atlanta and Alleviate Atlanta's Bandwidth Bottleneck,* Bus. Wire (Aug. 22, 2000).

[26] M. Fuller, *Fiberworks to Deploy Carrier-Agnostic All-Optical Local-Access Networks*, Lightwave (Nov. 2000).

[27] Comments of Yipes Transmission, Inc. at 13, *Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, CC Docket No. 96-98 (FCC filed June 11, 2001).

[28] A. Lindstrom, *Fiber: Part II*, America's Network (Sept. 1, 1998).

[29] F.J. Governali, *et al.*, Credit Suisse First Boston Corp., Investext Rpt. No. 2699472, Northeast Optic Network – Company Report at *4 (Sept. 10, 1998).

[30] *Interview with Robert Manning, CFO, Intermedia Communications*, CNBC/Dow Jones (June 25, 1998).

[31] *See, e.g.,* E.G. Henderson, Duff & Phelps Credit Rating Co., Investext Rpt. No. 2988183, Telecom Services Update – Industry Report at *7 (Nov. 9, 1999) (XO Communications "establishes a wireless link to buildings first and later builds fiber to the buildings after the company has reached its desired customer penetration rate to justify building."); Comments of WorldCom, Inc. at i, *Amendment of Part 2 of the Commission's Rules To Allocate Spectrum Below 3 GHz for Mobile and Fixed Services To Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems*, WT Docket No. 00-258 (FCC filed Feb. 22, 2001) (WorldCom has "invested over $1 billion for the rights to use MMDS/ITFS spectrum in 160 markets throughout the United States"); *AT&T/TCG Application* at 7-8 ("AT&T's acquisition of TCG holds great promise for the development of facilities-based local competition by taking full advantage of the complementary aspects of AT&T's long distance and wireless networks and marketing expertise and TCG's local fiber optic and broadband wireless capabilities and rights-of-way.").

cheaply than fiber.[32]

2. CLECs Are Making Little Use of Unbundled High-Capacity Loops.

Although ILECs have made unbundled high-capacity loops available nationwide, CLECs are purchasing very few such loops. This is a further, strong indication that CLECs are able to serve the vast majority of their high-capacity customers with their own high-capacity facilities.

As shown in Table 2, CLECs have purchased only 72,000 high-capacity loops in the four Bell companies' regions combined. By comparison, CLECs have purchased approximately three million POTS loops in the BOC regions. *See* Figure 2. Virtually all of the high-capacity loops that CLECs have purchased are DS-1 loops. *See* Table 2 & Figure 2. CLECs have purchased only 140 DS-3 loops, and not a single loop above the DS-3 level. *See* Table 2.

Even the use of DS-1 loops is minuscule when viewed in relation to the number of lines that CLECs serve using their own loop facilities. CLECs have obtained approximately 72,000 unbundled DS-1 loops, while they are serving at least 12.5 million lines (and likely closer to 20 million) using their own loops. *See* Table 3; *see also* Table 1, *supra.*

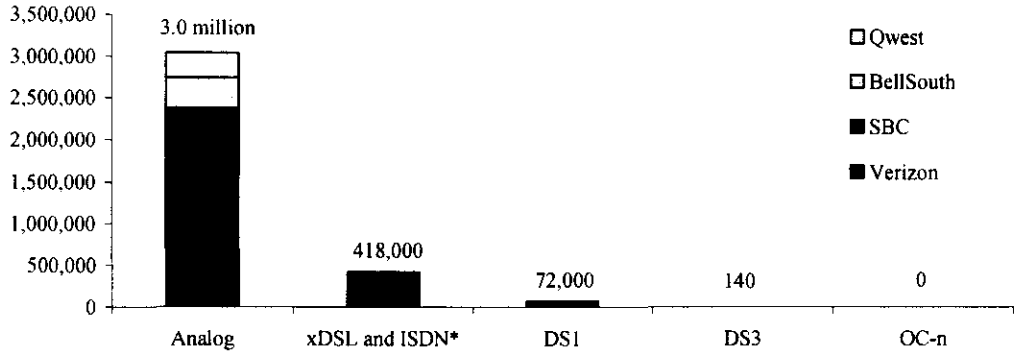
Table 2. Use of High-Capacity Loop UNEs

	High-Capacity Loops Purchased by CLECs					
	DS-1		DS-3		OC-3 or Higher	
	Total	% of all loops	Total	% of all loops	Total	% of all loops
Verizon	12,300	1%	60	0.005%	0	0%
SBC*	36,500	2%	70	0.004%	0	0%
BellSouth	18,600	4%	10	0.003%	0	0%
Qwest	4,700	2%	0	0%	0	0%
Total	**72,000**	**2%**	**140**	**0.004%**	**0**	**0%**

*Does not include Connecticut.

[32] *See, e.g.*, Wall Street Transcript Corp., Investext Rpt. No. 2003080, Analyst Interview: Telecommunications – Industry Report at *4 (Sept. 22, 2000) ("The capital efficiency of fixed wireless technology is attractive relative to the cost of deploying fiber connectivity to customer buildings. . . . fixed wireless technology lowers last-mile capital costs considerably.") (quoting Trent Spiridellis, Banc of America Telecommunications Analyst); W. Schaff, *Taking Stock: No Strings Attached*, Information Week (Feb. 22, 1999) ("Nextlink . . . has been concentrating on building fiber-optic connections to large offices and business parks. . . . Nextlink, however, intends to use the wireless system as a way to get to market faster. Once it has established service to a given location, it will build a fiber-optic connection to that location and relocate the radio equipment to another building."); WinStar Press Release, *IDT Corp. Announces the Acquisition of WinStar Communications, Inc.* (Dec. 20, 2001) ("WinStar's fixed wireless technology offers a solid last mile solution and is a great fit with IDT's long distance services and extensive fiber assets.").

Figure 2. Unbundled Loops by Type



*ISDN, HDSL, and IDSL loop volumes for Verizon are included in analog loop data.

Table 3. Use of High-Capacity Loop UNEs vs. Use of Self-Provided Loop
CLEC-Provided Loops = E911 Listings – Total Unbundled Loops

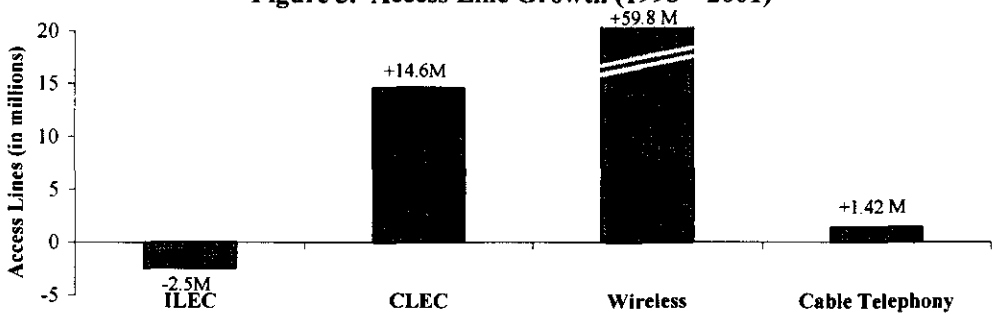
State	DS-1 Loops	CLEC-Provided Loops	State	DS-1 Loops	CLEC-Provided Loops
Alabama	1,200	116,000	Nevada	320	19,000
Arizona	270	517,000	New Hampshire	540	66,000
Arkansas	1,100	41,000	New Jersey	480	334,000
California	14,000	1,604,000	New Mexico	2	18,000
Colorado	240	571,000	New York	2,600	1,120,000
Delaware	660	12,000	North Carolina	2,600	179,000
Florida	3,900	482,000	North Dakota	50	5,800
Georgia	2,300	509,000	Ohio	1,600	207,000
Idaho	10	32,000	Oklahoma	790	100,000
Illinois	970	908,000	Oregon	1,300	332,000
Indiana	400	141,000	Pennsylvania	3,500	608,000
Iowa	7	45,000	Rhode Island	330	71,000
Kansas	1,500	24,000	South Carolina	1,900	79,000
Kentucky	470	30,000	South Dakota	20	31,000
Louisiana	3,000	103,000	Tennessee	2,900	214,000
Maine	190	(2,300)	Texas	9,300	500,000
Maryland	490	256,000	Utah	120	258,000
Massachusetts	1,700	733,000	Vermont	20	4,200
Michigan	1,700	260,000	Virginia	1,100	431,000
Minnesota	620	477,000	Washington	2,000	645,000
Mississippi	390	16,000	Washington, D.C.	100	145,000
Missouri	2,800	145,000	West Virginia	290	(6,000)
Montana	30	5,100	Wisconsin	1,600	173,000
Nebraska	5	114,000	Wyoming	1	(250)
			Total	**72,000**	**12.5 million**

Data do not include the former GTE service area and Connecticut.

B. POTS Loops.

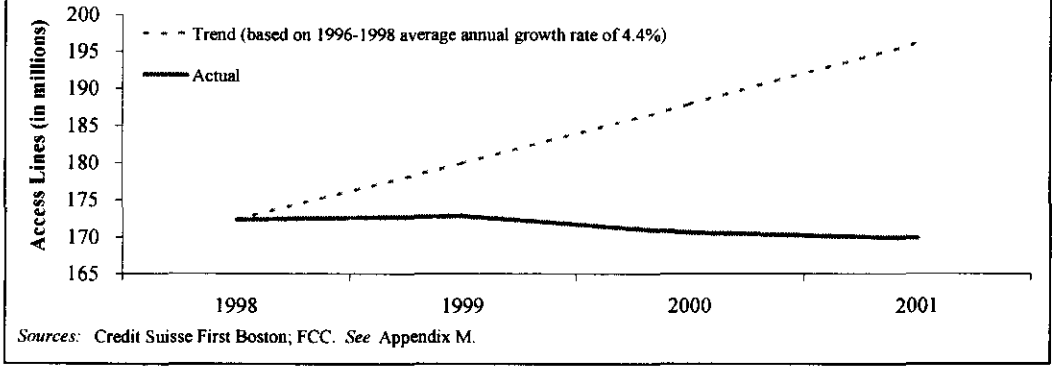
Technologies that compete directly against traditional POTS loops are rapidly being deployed across the country. Today, ILECs are losing about as many lines to wireless and cable networks as they are to wireline CLECs.[33] The number of lines served by ILECs has declined for the last three years running – a trend never witnessed before in a century of telephone service.[34] *See* Figure 3. And the trend is all the more dramatic given the year-over-year growth that ILECs have historically experienced. *See* Figure 4.

Figure 3. Access Line Growth (1998 – 2001)



Sources: Credit Suisse First Boston, JP Morgan H&Q, Kinetic Strategies, and NCTA. *See* Appendix M.

Figure 4. Decline of BOC Access Lines



Sources: Credit Suisse First Boston; FCC. *See* Appendix M.

[33] *See, e.g.*, R. Chopra, *et al.*, Deutsche Banc Alex. Brown, *Competitive Local Exchange Carriers (CLECs)* at 9 (Jan. 15, 2002) (estimating that SBC has lost an equal number of lines to CLECs and "technological substitution"); *Gartner U.S. Residential Wireline Report* at 5 ("A number of key factors contribute to this decline [in ILEC lines]: residential dial tone competition and customer adoption of new modes of communications that effectively displace 100-year-old-telephone technology."); *see also JP Morgan Telecom Services 2001 Report* at 41.

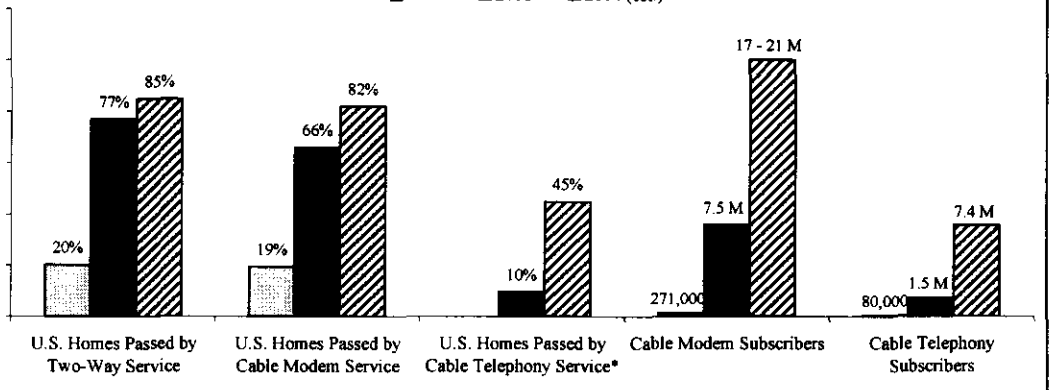
[34] ILEC end user lines declined from 181 million in December of 1999, to 179 million in June of 2000, to 177 million in December of 2000, and 174 million in June of 2001. *See FCC Local Competition Report, Feb. 2002 ed.* at Table 1; *see also Gartner U.S. Residential Wireline Report* at 5 ("With the release of second quarter 2001 financial and operational results, these incumbent providers (Verizon, SBC, BellSouth, Qwest) reported aggregate reductions in the number of residence access lines served within their territories, resulting in a 1.8 percent year-over-year decline and a 0.9 percent quarter-over-quarter sequential decline."); S. Flannery, *et al.*, Morgan Stanley, Dean Witter, Telecom – Wireline: Telecom Trend Tracker: Defense is Best Strategy at Exh. 2 (Aug. 17, 2001) (Year-over-year, Verizon, SBC and BellSouth had drops in access lines of 0.4 percent, 1.1 percent, and 0.8 percent, respectively, from 2Q00 to 2Q01).

1. Cable Networks as Substitutes for ILEC Loops.

Congress anticipated the emergence of cable/telephone competition in 1996.[35] In its 1999 *UNE Remand Order*, however, the Commission was not yet ready to conclude that cable offered a viable alternative to ILEC loops, because service was still "largely restricted to residential subscribers, and [cable] generally supports only one-way service, not the two-way communications telephony requires."[36] As of year-end 1998, cable operators offered two-way capabilities to only about 20 percent of all homes (*i.e.*, to no more than 20 percent of the homes that cable served).[37]

In the past three years, cable operators have added two-way capabilities to almost all of their networks, using a hybrid-coax-fiber (HFC) architecture. *See* Figure 5. Cable operators now offer two-way capabilities to approximately 77 percent of all homes (approximately 82 percent of homes passed by cable).[38] Two-way capabilities are expected to reach 85 percent of all homes by 2004.[39] Although they depend on many of the same upgrades to the cable network,[40] these two-way capabilities have been implemented as two distinct services – (1) cable telephony, and (2) high-speed cable modem service.

Figure 5. Growth of Cable as a Voice and Data Competitor



* Data on U.S. homes passed by cable telephony in 1998 were unavailable.

Sources: See Appendix M.

[35] *See* Senate Conference Report 104-230, *Telecommunications Act of 1996* at 148, 104th Congress, 2nd Session (Feb. 1, 1996).

[36] *UNE Remand Order* ¶ 189.

[37] *See UNE Fact Report* at III-20 & n.54.

[38] *See Broadband 2001* at Table 6.

[39] *See id.*

[40] *See NCTA Cable Telephony Report* at 1 ("[T]he same upgrades that allow cable companies to offer high-speed Internet access and digital cable service help make it possible for cable to provide high-quality digital telephone service.").

As discussed in Section II.A.2, at least five cable operators have actually deployed commercial circuit-switched cable telephony. These cable operators currently offer circuit-switched telephony services to about 10 million U.S. homes – approximately 10 percent of all homes – in 20 states.[41] In some states, cable telephony is far more widely available than that.[42] For example, Cox offers service to nearly all of the one million homes in Rhode Island, and AT&T offers cable telephony services to a large and increasing share of the nearly three million homes its cable network passes in the Boston Area, the approximately 600,000 homes it passes in the Pittsburgh area, the 3.5 million homes it passes in the Chicago area, and the 2.7 million homes it passes in the Bay Area.[43]

Nationwide, more than 1.5 million homes currently subscribe to cable telephony,[44] and 70,000 new subscribers are being added every month.[45] There are currently two major cable operators – AT&T and Cox – that are actively deploying circuit-switched cable telephony throughout their cable systems.[46] And as a result of its proposed merger with AT&T, Comcast plans soon to deploy cable telephony to about one million homes.[47]

With HFC in place,[48] cable plant can be adapted to provide bare bones switched phone service for about $800 to $825 per line.[49] This is the cost for providing "primary line" telephone

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[41] *See JP Morgan Cable Industry Report* at Table 22; *NCTA Cable Telephony Report* at 2.

[42] *See, e.g., Rhode Island Order* ¶ 105 ("Cox has the capability to provide cable telephony service to 75 to 95 percent of Rhode Island customers.").

[43] *See* Section II.A.2, notes 37-39.

[44] *See* NCTA, *US Cable Telephony Subscribers (in Thousands): 1998-2001*, http://www.ncta.com/industry_overview/indStats.cfm?statID=13.

[45] *See NCTA Cable Telephony Report* at 1.

[46] *See* Section II.A.2, notes 37-39.

[47] *See* Applications and Public Interest Statement of AT&T Corp. and Comcast Corporation at 38, *Application for Consent to the Transfer of Control of Licenses, Comcast Corporation and AT&T Corp., Transferors, to AT&T Comcast Corporation, Transferee*, MB Docket No. 02-70 (FCC filed Feb. 28, 2002) ("Comcast President (and AT&T Comcast CEO) Brian L. Roberts has announced that the merged company intends to begin to deploy telephone service in the Philadelphia and Detroit markets currently served by Comcast, after closing, bringing facilities-based local telephone choice to about one million additional homes.").

[48] *Broadband 2001* at 39 ("In addition to high-speed Internet and other high-bandwidth applications, new HFC networks can support telephony service over the cable plant.").

[49] *See, e.g.*, JP *Morgan Cable Industry Report* at 51-52 (about $375 per line for the actual equipment, another $125-$150 for the labor, and $300 for customer premises equipment); AT&T Broadband, *Investor Presentation* at 37 (July 2001) ($825 per line); *NCTA Cable Telephony Report* at 10 ("Cox, which has installed 11 switches in its largest markets, estimates its switching costs at $105 per customer (assuming a penetration rate of 25 per cent of homes passed and an average take-rate of 1.5 lines per customer). In addition, Cox spends and additional $505 per customer for the Network Interface Unit (NIU), the drop, the tap and the Headend Interface Terminal (HIT). This combined variable cost of $610 per customer for the provision of local telephony is in addition to the $220 per home passed that Cox must invest to upgrade its cable plant to 750 MHz capacity and to introduce two-way interactivity. It also does not include the $100 per customer that Cox is investing to power its cable networks to ensure that telephone service continues in the event of a power failure.").

service.[50] Cable telephony systems use the same, commercial, circuit switches and perform all the same functions as ILEC POTS services.

The imminent deployment of IP cable telephony will further accelerate the availability of cable networks as a competitive substitute for ILEC voice loops. As described in Section II.B, each of the major cable operators is now conducting trials of IP cable telephony, or has indicated plans to do so. Commercial deployment of the service as a secondary-line service is expected to begin within the next year or so;[51] there are expected to be between five and seven million cable IP telephony subscribers by 2006.[52] Cable operators are expected to deploy primary-line IP cable telephony service shortly thereafter.[53]

Cable operators also provides high-speed Internet access services, which compete directly with ILEC loops that have been used mainly for connecting to the Internet. In the past, many customers bought second phone lines for their computers, to support dial-up Internet connection. Second-line usage peaked in 1999, when approximately 27.5 percent of all households were buying second lines,[54] which they used mainly as dedicated data lines.[55]

Many of those same households are now buying broadband connections instead, and about two out of three of those connections are over cable.[56] As of year-end 1998, cable modem service was available to approximately 20 million homes, or roughly 20 percent of the U.S. mass market,[57] and there were approximately 500,000 cable modem subscribers.[58] Today, the service

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[50] *See, Broadband 2001* at 40; *see also* AT&T Broadband, *Investor Presentation* at 35 (July 2001) ("Primary line creates maximum market opportunity: 5-10X greater voice revenue per customer; 7-8X greater cash flow per customer; Less than 10% additional upgrade and rebuild capital required.").

[51] *See, e.g.*, R.A. Bilotti, Morgan Stanley, Dean Witter, Investext Rpt No. 8202634, Cable: The Past Is Prologue to the Future – Industry Report at *5 (Oct. 5, 2001) ("We expect the cable operators to begin offering IP telephony in 2002/2003"); M. Paxton, Senior Analyst, Cahners In-Stat, *Cable Telephony – Moving Slowly But Surely*, CED (Jan. 2002), http://www.cedmagazine.com/ced/2002/0102/id6.htm ("most [MSOs awaiting IP telephony] remain confident that by late 2002/early 2003, cable telephony will be an important part of their service menu").

[52] *See, e.g., Forrester Sizing US Consumer Telecom Report* at 10-12 ("[B]y 2006, [cable companies] will reap the rewards of conversion to IP – an increased set of offerings at lowered costs – in the form of 4.8 million new packet lines.); *Strategis Group U.S. IP Cable Telephony Report* at Table 3.9 (predicting 7.36 million IP telephony lines by 2006).

[53] *See, e.g., JP Morgan Cable Industry Report* at 46 ("we suspect that most MSOs will deploy primary-line IP voice in 2004 or 2005"); *Strategis Group U.S. IP Cable Telephony Report* at 53 ("The majority of cable telephony subscribers will be lifeline IP users, and deployments are expected to ramp up considerably in 2004 and 2005."); *id.* at Table 3.9 (predicting 2.15 million lifeline IP cable telephony customers in 2004).

[54] *FCC Trends in Telephone Service, Aug. 2001 ed.* at Table 8.4 (28.6 million households with second lines in 1999); U.S. Dep't of Commerce, *USA Statistics in Brief* (2001) (103.9 million US households in 1999); (28.6 million/103.9 million = 27.5% of homes with second lines).

[55] *See, e.g.*, C.J. Lane, *Out of Line*, Tampa Trib. at 1 (Aug. 13, 2000) (citing Yankee Group study finding that approximately 60 percent of households with second lines use them for Internet access.).

[56] *Morgan Stanley Cable Modem/xDSL Report* at Exh. 3; *TeleChoice DSL Deployment Summary.*

[57] *See UNE Fact Report* at III-21 & n.61.

[58] *See* NCTA, *US Cable Modem Subscribers: 1998-2001*, http://www.ncta.com/industry_overview/indStats.cfm?statID=15.

is available to between two-thirds and three-quarters of all U.S. homes,[59] and approximately 7.5 million homes subscribe.[60] One respected analyst now predicts that cable "will capture around 65% of the secondary line market by 2006."[61]

2. Mobile Wireless as Substitute for POTS Loops.

At the time of the *UNE Remand Order*, the Commission concluded that wireless phones did not yet offer a sufficiently robust competitive alternative to ILEC loops to justify any cut back on availability of the loop UNE.[62] Wireless service areas were less ubiquitous; they did not offer the same functionality; their data capabilities were "generally inferior;" and their sound quality was not always as good.[63] Wireless links offered "promising" but "not yet viable alternatives" to wireline loops.[64]

As discussed in more detail in Section II.C, conditions have changed significantly since that time. Independent experts now almost uniformly conclude that wireless is a significant competitive substitute for second-line service today.[65] For example, IDC found that, as of year-end 2001, "10 million wireline access lines will have been displaced by wireless, primarily by consumers choosing wireless service over installing an additional access line at home."[66] IDC estimates that, by 2005, wireless phones will replace 30 to 35 percent of second and additional wireline access lines.[67] Many other independent analysts have reached similar conclusions.[68]

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[59] *See Morgan Stanley Cable Modem/xDSL Report* at Exh. 3 (estimating 75 million homes passed by cable modem service as of year-end 2001); *JP Morgan Telecom Services 2001 Report* at Table 15 (estimating 106.4 million US households as of year-end 2001) (74.92/106.4 = 70.4 percent of US homes passed by cable modem service); *see also NCTA Industry Statistics* (70 million homes passed by cable modem service as of November 2001); *Yankee Group Consumer Broadband Report* at 4 ("At year-end 2001, approximately 66% of the households in the United States will have cable modem service available to them."); *Broadband 2001* at Table 6.

[60] *See Morgan Stanley Cable Modem/xDSL Report* at Exh. 3.

[61] *JP Morgan Cable Industry Report* at 53.

[62] *UNE Remand Order* ¶ 188.

[63] *Id.*

[64] *Id.*

[65] Wireless service also clearly competes directly, today, against wireline payphone service and other wireline services used outside the home and regular office – hotel phones, for example. *See, e.g., Sixth CMRS Report* at 32 & n.211; Michael Powell, Chairman, FCC, *Question and Answer with Chairman Powell*, remarks before the Forrester Research Telecom Forum (May 21, 2001) ("I haven't picked up the phone in a hotel in five years, because I use my wireless phone.").

[66] *IDC Wireless Displacement Report* at 1; *see also Zacks All-Star Analyst Issues Recommendations for 5 Stocks*, PR Newswire (Nov. 15, 2001) (Drake Johnstone, Davenport & Co.: "[C]onsumers are using their wireless phone line as a second phone line."); T. Fowler, *The Low Cost of Going Wireless; More Callers Cut Cords As Cell Phone Rates Fall*, Houston Chronicle (Aug. 8, 2001) ("Many [people] are using [wireless phones] as replacements for second lines in their homes.").

[67] *See IDC Wireless Displacement Report* at Figure 15.

[68] *See, e.g., Forrester Sizing US Consumer Telecom Report* at 9 ("Over the next five years, the mobile business will take a cut at fixed-line revenues. Wireless operators will ravage the fixed-line business as 5.5 million customers give up secondary lines."); *JP Morgan Telecom Services 2001 Report* at Table 26 (By 2006, over 2.8 million

Wireless is now becoming increasingly competitive with primary line wireline services as well. A Yankee Group survey in early 2001 found that about 3 percent of wireless subscribers had now abandoned wireline in favor of wireless entirely.[69] A wireless industry association has estimated that the number as of that date "could be as high as 5 percent."[70] A recent *USA Today*/CNN/Gallup poll found that 18 percent of cell phone users "use cell phones as their primary phones."[71]

Many wireless carriers are now marketing their services as direct substitutes for wireline service. The Commission's *Sixth CMRS Report*, for example, describes the Cricket service offered by Leap Wireless – a service offered "at a flat rate, paid in advance each month," in order to be "competitive with traditional landline service."[72] As noted by one industry publication, the Cricket business model "has been successful enough that several regional carriers have started offering their subscribers 'Leap-alike' plans," including ALLTEL's "Boomerang," US Unwired's "Freedom Plan," and Dobson Cellular's Cellular One "Breeze" service.[73] VoiceStream's advertisements exhort customers to abandon their wireline phones,[74] and the company's CEO states that they "view wireless as a replacement for wireline."[75]

So far as service quality is concerned, wireless is now fully competitive with wireline – and better than competitive in one key respect. In almost all major markets, wireless carriers now offer digital calls with connection quality comparable to the quality of wireline service,[76]

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people will have substituted a wireless phone for a secondary line.); *Gartner U.S. Residential Wireline Report* at 11 ("Of all households reporting a residence access line replacement over the past six months, 2.3 million or 33 percent of lines were replaced with a cellular/PCS phone.").

[69] *Sixth CMRS Report* at 32 (citing Yankee Group survey cited in J. Sarles, *Wireless Users Hanging Up On Landline Phones*, Nashville Bus. J. (Feb. 2, 2001)).

[70] *Id.* at 32, n.207 (citing *Consumers Replacing Landline Phones with Wireless*, Knight Ridder/Trib. Bus. News (Jan. 10, 2001).

[71] M. Kessler, *18% See Cell Phones as Their Main Phones*, USA Today (Jan. 31, 2002).

[72] *Sixth CMRS Report* at 33-34; Leap Wireless, *Investor Relations*, http://www.leapwireless.com/cindex.html.

[73] *See* D. Mendez-Wilson, *Cricket Copycats on the Make; 'Leap-Alike' Services Hop into Markets Across the Country*, Wireless Week at 24 (Aug. 20, 2001).

[74] *See, e.g.*, R. Saunders, *Don't Kill the Catalyst for Telecom Competition*, Milwaukee Bus. J. (Nov. 16, 2001), http://Milwaukee.bizjournals.com/Milwaukee/stories/2001/11/19/editorial3.html ("VoiceStream Wireless, which provides service in the Milwaukee area, has launched a TV advertising campaign on ways to use your wireless phone for purposes other than conversations with friends and loved ones. One commercial shows a woman using her phone as a meat tenderizer, while another ad suggests that the phone makes a good chew toy for your Labrador retriever. The message is simple: Cellular calling plans are so cheap that you don't need the local or long-distance phone company anymore.").

[75] E. Mooney, *VoiceStream Prepares for Transnational Race for Customers*, Radio Comm. Report (Apr. 10, 2000); *see also* AT&T Wireless and VoiceStream Wireless Petition for Declaratory Ruling at 3, *Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, CC Docket No. 96-98 (FCC filed Nov. 19, 2001) ("CMRS providers offer true facilities-based competitive alternatives to incumbent LECs. Increasingly, they are viewed as full-fledged competitors of landline carriers in the provision of telephone exchange service.").

[76] *See* Telephia, *Wireless Network Performance in the U.S. Metro Areas* (July 2001) ("A comprehensive study undertaken by Telephia from data collected from November 1999 to April 2001 concluded that 'wireless customers receive a high level of service in both core and suburban areas . . . Wireless customers on average can place, hold, and complete a call of acceptable audio quality 96-99 percent of the time.'").

and in some respects (*e.g.*, operator services) often superior. Nearly 80 percent of wireless customers now subscribe to high-quality digital service;[77] dial-up wireline service, by contrast, remains overwhelmingly analog.[78] The rate of busy circuits and dropped calls on wireless networks is improving rapidly.[79] Wireless E911 location capability is now virtually the same as wireline capability, and it is being rapidly deployed.[80] And wireless service is unambiguously superior to wireline in that the wireless phone is mobile. Mobility is, self evidently, a very valuable feature, and one that has historically commanded a high price premium in the market.

Wireless is now price competitive with wireline services, particularly when the comparison is made between equivalent bundles of service. The typical wireline customer purchases not only basic local service, but also long-distance service and some number of value-added features like call waiting, voice mail, or caller ID.[81] Wireless carriers typically provide all of these add-on services, and often for no extra charge.[82] Taking into account the whole package of service most typically sold, a November 2001 Gartner Dataquest study accordingly concludes that wireless calling prices are already "competitive with, and in some case better than, wireline calling rates."[83] And wireless prices continue to decline rapidly – by as much as 10 to 20 percent a year in recent years.[84]

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[77] *See, e.g.*, Dr. Robert F. Roche, CTIA, *Measuring Wireless Today*, http://wireless.fcc.gov/services/cmrs/presentations/Bob_Roche_Feb_28_FCC_presentation.pdf (showing approximately 25 million analog subscribers as of June 2001, compared to about 100 million digital subscribers); *see also Sixth CMRS Report* at 6 ("[A]t the end of 2000, digital customers made up 62 percent of the industry total, up from 51 percent at the end of 1999 and 30 percent two years ago.").

[78] *See FCC Statistics of Common Carriers, 2000/2001 ed.* at Table 2.3 (162 million analog switched access lines compared to 10 million digital lines).

[79] *See, e.g.*, *Gartner U.S. Residential Wireline Report* at 11 ("It is only over the last year that there has been a measurable shift by consumers to replace their wireline access lines with the cellular/PCS alternative – clearly an indication that cellular/PCS has overcome the quality and reliability weakness in the mind of the consumer."); AARP, *Understanding Consumer Use of Wireless Telephone Service*, http://research.aarp.org/consume/d17328_wireless_1.html. ("Wireless telephones are becoming more popular in the United States as the cost has become more affordable and the quality of wireless service has improved.").

[80] *See, e.g.*, Thomas J. Sugrue, Prepared Testimony before the Subcommittee on Communications, Committee on Commerce, Science, and Transportation, United States Senate, at 6 (Oct. 16, 2001) ("Wireless location technology is available, is being deployed in networks and handsets, and is capable of accurately locating 911 callers." By October 2002, "the location of 911 calls will be reported in most instances with an accuracy of 100 meters or less. Network equipment and handsets with location capability are now being manufactured and sold to meet and exceed this benchmark.").

[81] *See, e.g.*, *JP Morgan Cable Industry Report* at 50 (the average voice customer generates approximately $58 in monthly revenues, only $18 of which is for basic local service; the average revenue generated for vertical features is nearly $5, and the average revenue generated in access charges is about $5.50).

[82] *See, e.g.*, Sprint PCS, *Sprint PCS Wireless Service Plans*, http://www1.sprintpcs.com/explore/servicePlans OptionsV2/PlansOptions.jsp (All Sprint PCS service plans include voicemail, call waiting, caller ID, numeric paging, and three way calling.); VoiceStream, *Products and Services, Rate Plans*, http://www.voicestream.com/products/services/rateplans/dc_balt.asp (all VoiceStream plans include voicemail, call waiting, caller ID, built-in paging, and conference calling).

[83] *Gartner U.S. Consumer Telecommunications and Online Market Report* at 33.

[84] *See, e.g.*, *Sixth CMRS Report* at 6.

3. Direct Competitive Overbuild of ILEC Loops.

A number of CLECs are now building their own all-new loop facilities to serve residential customers. The business plans of these CLECs typically involve the provision of service to one small geographic area at a time – anywhere from a single apartment building to a small cluster of homes. They also often involve the deployment of facilities that enable the provision of more than just basic voice service, but video and broadband Internet services as well.

A number of smaller incumbent local exchange carriers have established CLEC affiliates in order to "target RBOC markers that are geographically proximate to their existing ILEC holdings."[85] *See* Table 4. This geographic "edge-out" strategy enables the CLEC "to take advantage of the synergy of its ILEC and CLEC operations while entering typically underserved non-urban markets."[86] The CLEC may, for example, "leverage the excess capacity on [its] existing plant to reduce startup and entry costs."[87] In many cases, such CLECs will "begin marketing mobile wireless service in new markets before their entry into the competitive market," so that when they "enter the new wireline markets, customers are already familiar with their reputation and quality of service, providing the [CLEC] with significant competitive advantage."[88]

Another overbuild strategy involves the deployment of a broadband pipe (generally either hybrid fiber coax or pure fiber) to provision high-speed bundled service offerings to individual neighborhoods or the approximately 30-35 percent of the population that live in multi-dwelling units. *See* Table 5.[89] Several CLEC affiliates of incumbent LECs – including PennTel and Hickory Tech – have taken this approach.[90] This also has been the strategy of RCN, which has been "constructing advanced networks in select markets with high levels of population density and favorable demographics along the West and East Coasts, along with Chicago."[91] In the fourth quarter of 2001 alone, RCN added nearly 47,000 new subscriber connections (including

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[85] *NPRG CIOC Report 2001*, Ch. 2 at 1.

[86] *Id.*

[87] *Id.*, Ch. 4 at 1.

[88] *Id.*, Ch. 4 at 1-2.

[89] *See, e.g.*, Robert Currey, Vice Chairman, RCN Corporation, Prepared Testimony before the Senate Subcommittee on Antitrust, Business Rights, and Competition, Committee on the Judiciary, *Cable and Video: Competitive Choices*, Federal News Service (Apr. 4, 2001) ("About 30-35 percent of the population lives in multiple dwelling units (MDUs), such as apartments, cooperatives or condominiums.").

[90] *NPRG CIOC Report 2001*, Ch. 4 at 2.

[91] K. Hoexter, Merrill Lynch Capital Markets, Investext Rpt No. 8232380, RCN Corp. – Company Report at *2 (Oct. 24, 2001).

about 16,000 voice connections) to its network.[92] In the approximately four years since it began the process, RCN has built out is network to pass more than 1.5 million homes.[93]

In addition to overbuilding ILEC networks, some CLECs are pursuing a "greenfield" strategy, which involves deploying facilities in brand-new developments where there is no incumbent provider. For example, in its "Greenfield markets" in Charlotte and Raleigh, CTC deploys "our own remote switching equipment, as well as build a distribution system to in effect, become the local telephone company for each new development."[94] CTC is "working with developers and builders to become the 'official telecommunications provider' for their developments."[95] The company states that, "[b]y clustering our projects, we are able to gain capital and service efficiencies."[96] As of September 2001, CTC was "adding about 1,000 CLEC lines a month."[97] Another CLEC – BTI – is targeting new "residential developments," and was awarded a major contract for a large development in Chapel Hill that includes "three schools, a 500-acre commercial tract and 4,000 homes."[98]

Table 4. CLEC Operations of Non-Bell Company ILECs

Carriers	CLEC Operations
ALLTEL Communications	"ALLTEL has been successfully utilizing its wireless brand recognition to expand its CLEC operations into areas within its wireless footprint." "In the markets that have been operational the longest, Little Rock, AR, and Charlotte, NC, the Company has achieved 50% and 8% penetration, respectively."
Blackfoot Tel. Coop.	"Blackfoot is anticipating significant growth and is expending $7 million to build out its infrastructure."
CEI Networks	"CEI plans to expand service via an edge out strategy once it has fully deployed HFC to its initial markets in 2002."
Century Tel	"The Company is currently offering CLEC services to residential and small and medium sized business customers in Shreveport and Monroe, LA. CenturyTel will employ 'edge-out' strategy for its CLEC expansion. . . . CenturyTel has budgeted more than $20 million of its 2001 capital expenditures to support this expansion."
CTC Exchange Services	"In 1998, CT Communications began offering CLEC service in markets contiguous to its ILEC market. . . . The CLEC offers services similar to those offered by the ILEC by offering facilities based services while leveraging existing back office and billing operations of its parent."
CTC Telcom	"CTC Telcom is currently serving over 7,000 CLEC access lines in the communities of Barron, Rice Lake, and Chetek, WI. Each of its CLEC markets is adjacent to its parent company's ILEC exchanges."
CTS Telecom d/b/a Climax Tel. Co.	"The Company started offering CLEC services in 1997 to businesses in Battle Creek, Kalamazoo, Galesburg, and Scotts, MI. The CTS network employs a Lucent 5ESS 2000 switch."

[92] RCN Press Release, *RCN Announces Fourth Quarter and Year-End 2001 Results* (Feb. 8, 2002); *id.* (in 4Q01 RCN "added over 43,000 marketable homes to its broadband footprint, and is now selling multiple services to over 1.5 million homes.").

[93] *Id.*

[94] CT Communications, Form 10-K/A at 5 (SEC filed Dec. 19, 2001).

[95] *Id.* at 1; *see also* J. Engebretson, *Edging Out the Incumbent*, America's Network (Sept. 1, 2001) (CTC's "green-field business had its genesis in a project it did with the Mills Corp., a real estate investment trust that builds shopping malls nationwide. CT won the contract to provide phone service to a new mall Mills was building in BellSouth territory. It now serves every business in the mall. It also has won similar contracts for other new construction projects with Mills and other companies.").

[96] CT Communications, Form 10-K/A at 1 (SEC filed Dec. 19, 2001).

[97] J. Engebretson, *Edging Out the Incumbent*, America's Network (Sept. 1, 2001).

[98] BTI Press Release, *Meadowmont Selects BTI as Preferred Telecommunications Provider for Residents* (Mar. 31, 2000).

Table 4. CLEC Operations of Non-Bell Company ILECs	
Carriers	**CLEC Operations**
CTSI	Operates CLEC networks in Wilkes-Barre/Scranton/Hazelton; Harrisburg; and Lancaster/Reading/York, PA. "CTSI serves 94% of its access lines by its own switches and 45% of access lines are served solely by the CTSI network."
ExOp of Missouri	"ExOp currently offers a variety of services to the population of 5,000 in Kearney, a city just outside of Kansas City, MO." "Through the partnership with UtiliCorp, ExOp is expanding its fiber network and service offerings. . . into the rural communities that make up UtiliCorp's energy service territory."
Fidelity Comm. Services (FCS)	FCS began offering CLEC services in Rolla, MO in March 2001. "FCS is serving business and residential customers in Rolla from its Lucent 5ESS Class Five switch located in Sullivan, MO."
Goldfield Access Network (GAN)	"GAN is pursuing an edge-out strategy in offering its services to businesses in nearby communities where the Goldfield name has brand recognition."
Heart of Iowa Communications	"Heart of Iowa began CLEC operations in August 1998. The Company employed an 'edge-out' strategy and targeted markets adjacent to those in which it was offering ILEC services. Heart of Iowa is currently serving its CLEC markets from its single Siemens' EWSD switch."
HickoryTech	"The Company used an overbuild strategy, installing its network next to the existing US West network and laying wire directly next to residents' homes." "HickoryTech uses a host switch that is owned by its sister company and ILEC, Mankato Citizens Telephone Company. HickoryTech deploys remote switches in the markets it serves."
HTC Communications	"HTC began offering CLEC services in 1998. The Company is currently operating its CLEC business in two of its ILEC exchanges, Myrtle Beach and Conway, SC."
Mid-Maine Communications	"In 2000, Mid-Maine began operating as a CLEC in several communities in Maine. By the end of the year, the Company had expanded into 12 markets." "Mid-Maine currently offers local dial tone and DSL to business and residential customers in Auburn, Augusta, Bangor, Brewer, Ellsworth, Lewiston, Portland, and Waterville."
Mid Rivers Communications	"Mid-Rivers Communications, offers competitive telephone services to several Tier Three, Four, and Five markets, adjacent to its parent's ILEC markets, in Montana and a small portion of North Dakota. . . . Mid-River Communications serves its CLEC exchanges from its Siemens EWSD Class Five switch which is installed in Mid-Rivers' Central Offices located in Glendive, MT."
Nex-Tech	The CLEC subsidiary of Rural Telephone in Kansas is "is targeting and capturing new CLEC communities" served by SWBT
NTELOS	"NTELOS enters markets that are physically proximate to its existing ILEC operations and uses its brand and existing infrastructure to expand into them." "Wireless is marketed strongly to small and medium-sized business to gain brand recognition and trust. NTELOS later approaches these same customers to offer them CLEC service for their businesses."
Otter Tail	"Otter Tail began offering local switched service in January 1999 and currently serves four markets in Minnesota."
Panhandle Telecom. Systems	"PTSI began offering CLEC services in Perryton, TX in January 2001 . . . The Company is currently offering competitive services from its Nortel DMS-100 host switch located in Guymon, OK."
Penn Telecom (d/b/a Penntele.com)	"PTI employs an edge out strategy and has entered markets proximate to the footprint of North Pittsburgh Telephone Company." "While PTI has concentrated on small to medium-sized businesses, it is also experimenting with offering its bundled services in the two affluent suburbs of Perrysville and Sewickley."
Sharon Telephone Company	"The Company offers local phone and Internet services from its single Nortel DMS-10 switch in Sharon, WI, to the towns of Darien, WI, and Harvard, IL."
Silver Star Communications	"Silver Star Communications is currently offering competitive voice and data services in Afton, WY from its single Nortel DMS-10 switch."
TDS Metrocom	"TDS Metrocom serves three extended markets in Wisconsin, offering local dial tone, data, and Internet services to both business and residential customers."
Sources: See Appendix M.	

Table 5. Hybrid Fiber Coax (HFC) and Multi-Dwelling Unit (MDU) Providers	
RCN/Starpower	"About 30-35% of the total population lives in multiple dwelling units (MDUs), such as apartments, cooperatives or condominiums. The ability to serve this sector of the market is crucial because it is generally more profitable due to the large number of subscribers in each MDU."
Knology	Knology began operating in Montgomery, Ala., and targets towns with between 100,000 and 300,000 homes, including Augusta, Columbus, and West Point, Ga.; Huntsville and Montgomery, Ala.; Charleston, S.C.; and Panama City, Fla., and Knoxville, Tenn. Knology's network now passes 380,000 homes and 142,008 buildings. "Knology gained more than 30,000 MDU clients [in 2000] alone, a 27% increase from 1999."
MultiBand (Vicom)	"MultiBand . . . delivers local dial tone, long distance, satellite based digital cable television, and high speed internet services on one combined billing and delivery platform to residents of multi-dwelling properties."
Grande Communications	"Grande is building an advanced deep fiber broadband network that will deliver high-speed Internet, local and long-distance telephone and cable television service to homes, MDUs and businesses in the Austin/San Antonio corridor." "Grande's entire MDU portfolio . . . represents over 8,000 units."
Sources: See Appendix M.	

C. Broadband Loops.

Broadband services are provided over the telephone network using digital subscriber line (DSL) technology, which relies on the same local loop plant used to provide narrowband voice service.

DSL over ILEC loops is only one of four main last-mile technologies that is currently used to provide broadband services to mass-market consumers. The other three are cable modem, satellite, and fixed terrestrial wireless. Both consumers and providers view all four of these various broadband services as interchangeable. Two or more of the main broadband technologies are frequently available in the same geographic areas.

Cable is the clear leader in the broadband market today, by a wide and growing margin. Cable modem service is currently available to between two-thirds and three-quarters of U.S. households,[99] whereas DSL service is available to only about 45-50 percent.[100] *See* Table 6. As of the year-end 2001, there were approximately 7.5 million cable modem subscribers in the U.S., compared to 3.3 million residential DSL subscribers.[101] *See* Figure 6. According to analysts,

[99] *See Yankee Group Critical Mass Report* at Exh. 4; *Broadband 2001* at Table 6. *See also NCTA Industry Statistics* (as of November 2001, 70 million households were passed by cable modem service). The cable industry association estimates that, by year-end 2002, approximately 95 million U.S. homes (or nearly 90 percent of homes passed by cable) will have access to cable modem service. *See* NCTA, *Cable & Telecommunications Industry Overview 2001* at Chart 2 (2001) (citing Morgan Stanley, Dean Witter, *Broadband Cable Second-Quarter Review* at 9 (Aug. 29, 2001)).

[100] *See, e.g., Yankee Group Critical Mass Report* at Exh. 4 (estimating that DSL will be available to 45 percent of all households by year-end 2001); *JP Morgan Cable Industry Report* at Figures 12 & 36 (DSL available to 43 percent of U.S. homes as of 1Q2001); P. Roche, *DSL Will Win Where It Matters*, McKinsey Quarterly 2001, No. 1 (2001) ("40 percent of all phone lines are ready for DSL").

[101] *See Morgan Stanley Cable Modem/xDSL Report* at Exh. 3 (cable modem); *TeleChoice DSL Deployment Summary* (residential DSL).

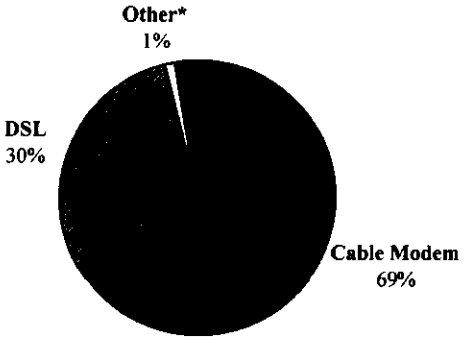
approximately one-third of all U.S. households currently have access to both cable modem and DSL service,[102] and approximately three-quarters of all homes with access to DSL also have access to cable modem service.[103]

Table 6. Availability of Broadband Services

	2001	2002	2003	2004	2005
Cable Modem					
McKinsey & Co. /JP Morgan	77%	81%	84%	85%	87%
Yankee Group	66%	77%	81%	82%	83%
DSL					
McKinsey & Co./JP Morgan	51%	60%	64%	70%	n/a
Yankee Group	45%	54%	62%	70%	74%
Satellite	50 states, covering over 90% of U.S. households				
Fixed Wireless	3%	n/a	n/a	n/a	41%

Sources: See Appendix M.

Figure 6. Market Share of Residential Broadband Subscribers YE 2001



*Satellite and fixed wireless.

Sources: Salomon Smith Barney, Morgan Stanley, Dean Witter, and TeleChoice. *See* Appendix M.

Cable is adding new subscribers at a faster rate than competing high-speed technologies. *See* Figure 7. And most analysts expect cable to maintain a considerable lead over DSL and other broadband technologies for the foreseeable future.[104] The principal reason is simply that

[102] *See, e.g.*, JP *Morgan Cable Industry Report* at Figures 12 & 36; *Broadband 2001* at Chart 25.

[103] *See, e.g., JP Morgan Cable Industry Report* at Figures 12 & 36 (JP Morgan estimates that as of 1Q 2001, 10 percent of households had access to DSL only, and 33 percent had a choice of DSL or cable; therefore, approximately one-quarter of households with access to DSL did not have access to cable (10/43=23.3)).

[104] *See, e.g., Broadband 2001* at Table 9 (estimating that by 2005, cable will have 51 percent of broadband subscribers, while DSL will have 37 percent.); *Yankee Group Consumer Broadband Report* at Chart 1 (predicting that by 2005, cable will have 48.5 percent of high-speed users, while DSL will have 33.8 percent); *Salomon Smith Barney Battle for High-Speed Data Report* at 1 (cable will account for 59 percent of subscribers and DSL will account for 34 percent in 2005); M. Pastore, *High Speed Access to Pass Dial-Up in 2005*, Cyberatlas (Jan. 22, 2001), http://cyberatlas.internet.com/markets/broadband/article/0,1323,10099_567101,00.html (citing Strategis Group Study